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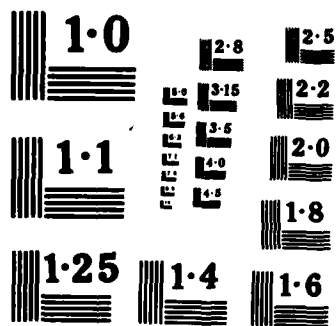
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James A. Thomson

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## STRATEGIC DEFENSE AND DETERRENCE

James A. Thomson

Statement Before  
Defense Appropriations Sub-Committee  
of the House Appropriations Committee  
May 9, 1984

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Mr. Chairman:

In my testimony today, I intend to deal with one of the most fundamental questions underlying the current debate over the administration's strategic defense initiative: Will the addition of the significant strategic defense capability help us to deter Soviet aggression better than if we did not have such an addition? To deal with this question, I will draw on a study that I led at The Rand Corporation in the summer of 1983. This study was requested by the Air Force and was carried out at the same time that the administration was conducting its internal reviews. Although our study was done independently of those studies, we kept in touch with the administration's study teams and we informed the administration of our results during the fall of 1983. Nonetheless, the conclusions I draw from our study, as well as my additional comments, are my personal views and do not necessarily reflect those of The Rand Corporation or the sponsors of its research.

Not surprisingly, the debate over strategic defense has quickly become polarized into advocacy and opposition. Our analysis shows that both sides can be correct in their views. But their views are based upon quite different prior assumptions.

For example, let's look at the issue of a leakproof defense of our population:

- The opponents claim that a leakproof defense is impossible because the offense can always overwhelm the defense. Our analysis indicates that they are probably right.
- The advocates say that that is not the point. Most concede that leakproof population defense is probably out of the question, but argue that strategic defenses can complicate Soviet attack planning and so reduce the effectiveness of Soviet offensive forces that they are no longer of much use. Our analysis indicates that under certain circumstances, the advocates can be right.

Another issue on which the debate is polarized is strategic stability:

- The opponents claim that defenses will be destabilizing because they will increase incentives for one side to strike first in a crisis. According to our analysis, this is correct, if the offensive forces are large and vulnerable.
- The advocates say that the defenses will improve stability by making offensive attacks more difficult. This can also be correct, if the offensive forces are relatively small and invulnerable.

The issues raised in this debate would be most relevant if we were facing a decision to deploy a robust strategic defense system. But that is not the issue facing us today. The administration is only proposing an R&D effort, with a deployment decision to be taken sometime later, if at all. Accordingly, we have time to understand these issues.

We took a first step in looking at these issues last summer. Let me turn now to what we did. I will address technology options, the issue of offense vs. defense in an arms race, crisis stability and extended deterrence.

#### TECHNOLOGY OPTIONS

We were initially interested in the question of whether the strategic defenses that might be possible beyond the year 2000 could provide an effective defense of U.S. population. For this analysis, we needed to understand which of the technological options for space-based defensive weapons seemed most cost-effective. At this stage, this is a difficult analytic problem at best because neither the effectiveness nor the costs of these proposed weapons are well understood. Nevertheless, we gathered estimates from industry and government and constructed a model that allowed us to compare the cost-effectiveness of the five technology options that we studied. These options were rocket-propelled impactors, electromagnetic guns, chemical lasers, x-ray lasers and neutral particle beams. In our model, the weapons were deployed in low-earth orbit and attacked Soviet missiles as they were launched from different locations in the USSR at different targets in the United States and Western Europe.

From this analysis, we concluded that kinetic energy weapons-- specifically the rocket-propelled impactors or the electromagnetic guns-- appeared more cost-effective than beam weapons. But this conclusion depended critically on our assumption that the weapons would be able to attack the Soviet warheads after they had separated from the missile. To accomplish this, we would need to be able to discriminate Soviet warheads during the mid-course of flight--after separation from the boosters, but before reentry. If this technologically difficult problem cannot be solved, then probably a mix of beam and kinetic energy weapons would be advisable. These are preliminary results. More work is needed to assess both the cost and effectiveness of the various technologies as our R&D programs move forward.

#### Offense Vs. Defense

In our analysis, we then deployed the most cost-effective system-- the rocket-propelled impactor--and backed it up with a terminal defense of ground-based interceptors to protect U.S. population to various levels of effectiveness. We then permitted the Soviets to add to their offensive forces and the United States to respond by adding to its defenses in order to maintain the defense's effectiveness. From this analysis, we could estimate whether the offense or the defense would have the economic advantage in an arms race.

We concluded that the offense would have the advantage. This advantage became overwhelming if we were attempting to protect population to very high levels of effectiveness, or what might be called near-leakproof defenses. At lower levels of protection, the offense still had an advantage, but not so pronounced.



This analysis suggests that a strategy for deterrence that relies solely on the defense's ability to deny damage to a determined Soviet attacker is beyond our reach. In any case, a damage denial strategy would have to protect against more than ballistic missile attack. A *comprehensive* strategic defense would have to be developed that would also provide protection against air and cruise missile attack. Even if we could accomplish that, we would remain concerned about the possibility of clandestine weapon delivery.

While a leakproof defense for damage denial appears to be beyond our grasp, our analysis suggests a number of other points:

First, since the 1960s, when this issue was last addressed comprehensively, there have been important changes in the race between offensive and defensive forces favoring the defense. The most important technological change is the possibility that we will be able to destroy some Soviet missiles during the boost phase of their flight. Early engagement of Soviet missiles defeats cheap Soviet countermeasures: It destroys the missiles before they can deploy additional warheads or decoys that are intended to overwhelm or confuse the defense. The Soviets could, of course, take steps to defeat boost phase kill, such as shortening the flight time or flattening the trajectory of their missiles, but these steps would increase the cost and reduce the effectiveness of their forces. This highlights the critical importance of space-based weapons to a cost effective strategic defense.

Second, we have not yet estimated the offense's advantage over the defense when defenses protect military forces. It is far easier to provide protection for selected targets, such as military bases, vital

command centers, or ICBMs, than it is to provide protection of our population. An overlay of space-based defensive weapons, backed up by layers of defenses designed to protect selected military assets, whether here in the United States or overseas such as in Europe, should prove to be a more cost effective proposition than the protection of population. It is conceivable that we may be able to field very effective defense capabilities for this mission, although far more analysis needs to be done on this question.

Third, the race between the defense and the offense will favor the offense only so long as offensive forces remain cheap. In the estimates that I have just described, we assumed that the Soviets ran the offensive force race by deploying silo-based MIRVed ICBMs. These are indeed relatively inexpensive forces. However, in the time period that we were interested in, say the year 2000, they are also likely to be quite vulnerable to attack. When considering the cost of offensive forces, it is important to include the cost of making them survivable. For example, equivalent offensive capability in submarine-based forces might cost five times as much as an equivalent capability in more vulnerable silo-based ICBMs.

This suggests an important point. While defenses *by themselves* may not be adequate to protect population against offensive force attack, they might be adequate when coupled with offensive forces. What I mean by this is that the attacker's offensive forces would be used to destroy the adversary's vulnerable offensive forces, such as ICBMs. The attacker's defensive forces would then be able to absorb the blow delivered by the expensive but survivable enemy offensive forces, perhaps holding the resultant damage to the attacker's population and

economy to low levels. This is called a damage limiting strategy-- an effective offensive first strike is coupled with defensive forces to negate the effectiveness of the adversary's offensive capabilities. The change that is occurring in the race between the offense and defense is such that we cannot rule out the possibility that damage limiting strategies could become feasible in the future. This possibility also requires far more analytic scrutiny than anyone has given it so far.

Thus, while perfect defenses do not appear to be in the cards, it is conceivable in the next two to three decades, to deploy highly effective defenses that could work with offensive forces to change the shape of deterrence as we currently know it.

#### **Deterrence and Strategic Stability**

To illustrate this point, imagine that we were the only nation to deploy effective--but not perfect--comprehensive strategic defenses against ballistic missile and air attack, or that we were able to maintain a significant lead over the Soviets in these capabilities. This would obviously be tremendously advantageous to us. Even modestly capable defenses would complicate Soviet attack planning and dilute the effectiveness of any Soviet blow aimed at our military forces. If our strategic defense capabilities grew in effectiveness, we might obtain the theoretical damage limiting capability that I have just described. I say theoretical because such a capability requires that we contemplate a first strike against the Soviet Union. This would be an exceedingly dangerous gamble, and in any case, it is something which every American president since Truman has ruled out.

However, were the shoe on the other foot, and the Soviets to have a monopoly in strategic defense capability, or a clearcut advantage over us, the situation would be disastrous. The Soviets would possess the theoretical damage limiting capability. Deterrence would certainly work, but on Soviet terms, for we would be deterred from taking any actions to protect our friends and allies, or even ourselves, from Soviet aggression.

The situation would be far more complicated if both sides possessed effective comprehensive strategic defenses against both ballistic missile and air attack. It would depend critically on the nature of the offensive forces of the two sides. To give you a sense of how the situation might evolve, let me describe two cases that we examined in our study.

For the first case, the strategic offensive forces of both the United States and Soviet Union would continue to grow beyond the constraints of SALT II. The growth would feature MIRVing of ballistic missiles and large deployments of cruise missiles. The vulnerability of the offensive forces of the two sides would increase as missile accuracies improved to the point where virtually any fixed target was vulnerable. Such a situation of large, vulnerable strategic forces on both sides is bad because the side that strikes first can shift the balance of strategic forces sharply in its favor. This situation is often referred to as a counterforce instability. Counterforce instabilities are worrisome, and we should conduct our offensive force programs to avoid them, but so long as we retain an invulnerable portion of our force, for example in our submarines, a Soviet first strike would

most likely be deterred by Soviet knowledge that we could still launch a retaliatory strike against the Soviet Union.

However, if both sides began adding effective defenses, matters could become far worse. A point might be reached where one or both sides could achieve a damage limitation capability, but would possess it only if they struck first. Such a first strike would overcome the adversary's defenses and destroy the vulnerable portions of the adversary's strategic offensive forces. If the adversary attempted to strike back with the remaining portion of its strategic offensive forces, it would not be able to overcome the attacker's defenses. In this way, damage limitation would have been achieved. In other words, in this case our ability to deter a Soviet first strike would have been undermined, even though we possessed both offensive and defensive forces, because our second strike retaliation might be effectively countered by the Soviet defenses.

This unhappy situation should be contrasted with the second case that we studied. We assumed that the overall size of strategic offensive forces had been constrained and their vulnerability reduced. We used in our analysis the administration's START proposals, as they existed last summer. We also assumed that both sides deployed single-RV mobile ICBMs. Even without defenses, this situation is reasonably stable. Because the strategic offensive forces are relatively invulnerable, neither side could hope to gain a significant advantage from striking first. The addition of strategic defenses of even moderate effectiveness might make it disadvantageous to strike first because the first striker would use up more warheads in carrying out the attack than he could hope to destroy by it. Indeed, the combination of

relatively small and invulnerable offensive forces, coupled with strategic defenses, could create a highly stable strategic environment, perhaps even approaching the goal of ridding the world of the constant fear of nuclear warfare.

All these conclusions, however, must be tempered by the issue of the vulnerability of the defenses themselves. It is quite possible that the linchpin of a cost effective defense system--the space-based components--will be vulnerable. Indeed, they may be vulnerable to each other: A beam weapon that can shoot boosters rising from the earth may also be able to shoot at an adversary's satellite in an adjacent orbit. If the strategic balance rests upon both defensive and offensive capabilities and the defenses are vulnerable, the situation would be highly unstable. A first strike in space could shift the balance decisively. Therefore, if strategic defenses are to contribute to stable deterrence, the problem of vulnerable space-based assets will have to be solved.

Thus, strategic defenses can contribute to stable deterrence if they are survivable and if they are coupled with efforts to reduce the size and vulnerability of both sides' strategic offensive forces. We can undertake some of these efforts unilaterally; in particular, we can reduce the vulnerability of our own strategic offensive forces. But the achievement of a highly stable strategic environment involving both offenses and defenses probably requires a comprehensive arms control regime. This regime would:

- Reduce the size of offensive forces;

- Reduce the vulnerability of offensive forces;
- Regulate the mutual acquisition of defenses;
- Avoid the deployment of vulnerable defenses; and
- Include stringent verification measures that would guard against breakout of the agreement, which could be potentially decisive in a mixed offense/defense environment.

Whether such a regime is technically feasible and whether the Soviets can be induced to join it are other matters that need further scrutiny.

#### EXTENDED DETERRENCE

Even if we are able to create more stable nuclear deterrence through strategic defenses and arms control, an additional problem of deterrence would remain: namely, our ability to extend the protection afforded by our nuclear deterrent over our friends and allies.

In Europe, we implement extended deterrence through the NATO strategy of flexible response. As you know, this strategy calls for NATO to threaten to use nuclear weapons first, if necessary, and to deliberately escalate the conflict to higher levels until the Soviets are convinced to halt their aggression. The options for escalation include limited strikes by our nuclear forces on Soviet territory. To the extent that the Soviets acquire strategic defenses for the protection of their homeland, it will make it more difficult for NATO to execute limited nuclear strikes, and will thereby undermine the NATO concept of deliberate escalation. By the same token, a significant Soviet strategic defense force will probably also harm the effectiveness of the relatively small British and French strategic nuclear forces. In

the Ottawa declaration of 1974, NATO declared that these forces are part of its deterrence concept.

As Americans, we have always preferred to rely less on deliberate escalation than our European friends. We have stressed the importance of the NATO "direct defense" concept. While continuing to support the escalation strategy, successive American administrations have argued that the best way to deter a Soviet attack on Europe is to be able to defeat it, or at least to prevent it from succeeding, and have thus pushed for increases in NATO's conventional capability. Because they would reduce the viability of the nuclear escalation threats, strategic defenses would make it all the more important to improve NATO's conventional forces in order to deter Soviet aggression in Europe. Thus, if the Soviets obtain robust strategic defenses, both we and our allies may have to consider the need to build up our conventional forces, especially our ground forces, more seriously than we have so far.

These considerations may partially explain the negative reaction of some of our European Allies to the U.S. strategic defense proposals. They assume that U.S. strategic defense deployments would trigger a Soviet strategic defense build-up, and thus undermine NATO's nuclear escalation strategy. Consequently, the historic tension between the preferred deterrence concepts of the United States and our Allies is likely to be exacerbated by any U.S. move toward strategic defense.



## CONCLUSIONS

Mr. Chairman, allow me to summarize my remarks briefly:

First, technology is moving forward, making strategic defenses appear to be a more cost effective option than they were in the 1960s. However, far more progress will have to be made before strategic defenses can be seriously considered as a stand-alone option for the protection of our population. However, strategic defenses may be more viable in the role of protecting military forces or of working in combination with offensive forces to give the United States a strategic edge over the USSR.

Second, were we able to obtain a significant advantage over the USSR in strategic defenses, we could have a substantial measure of strategic superiority over them. This would be to our advantage. By the same token, however, should the Soviets obtain a significant advantage over us, the results could be strategically catastrophic for the United States.

Third, if both sides deploy significant strategic defense capabilities, the nature of the offensive force balance will become even more important than it is today; in particular, strategic force vulnerabilities that are worrisome today could prove disastrous for stable deterrence in a world that includes robust strategic defenses. However, if strategic forces can be reduced and their survivability increased, then the addition of strategic defenses can contribute to enhanced stable deterrence. Thus, the success of our arms control efforts on offensive arms may be the sine qua non for enhancing stability with strategic defenses.

- Fourth, this picture would be sharply changed should strategic defenses themselves prove vulnerable, for this might create the possibility of a first strike in space that would decisively alter the balance of forces on earth.

Fifth, strategic defenses are likely to call NATO's strategy of deliberate nuclear escalation into even deeper question than it is today. Both we and our allies would have to rely more heavily on conventional forces to deter conflict in Europe or elsewhere around the Soviet periphery.

Mr. Chairman, our research leads me to believe that the U.S. R&D program should be based on three criteria:

- First, our program should hedge against a Soviet breakout of the ABM Treaty and--in the longer term--against Soviet deployment of space-based defensive systems. We must remember that the Soviets already have a small strategic defense capability, have a historic commitment to the concept of strategic defense, and show few signs of being concerned about stable deterrence as we understand it. As I have already pointed out, the consequences of a significant Soviet lead in strategic defenses could be disastrous for us.
- Second, we should be looking for weapons concepts that will provide for quantum increases in capability and quantum reductions in cost. This suggests that we should continue to study a broad range of technology options and not proceed too quickly in the choice of advanced technologies.

- Finally, our technology programs need to be conducted with a view toward survivable defenses, especially for their space-based components.

While we move ahead with R&D and before we make a decision on deployment, we need to improve our understanding of both the potential and the desirable role of defenses in our national strategy.

Mister Chairman and members of the committee, that completes my remarks. I will be glad to answer your questions.

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